

00. NUMERAL SYSTEMS

Opción A

1. Do the following operations:

$$\begin{array}{r} 4\ 7\ 6\ 3\ 6_{(8)} \\ +\ 5\ 0\ 6\ 5\ 7_{(8)} \\ \hline \end{array}$$

$$\begin{array}{r} 4\ 0\ 4\ 3\ 0_{(5)} \\ -\ 2\ 4\ 3\ 0\ 3_{(5)} \\ \hline \end{array}$$

$$\begin{array}{r} 1\ 0\ 0\ 1\ 0_{(2)} \\ -\ 0\ 1\ 0\ 0\ 1_{(2)} \\ \hline \end{array}$$

2. Do the following operations:

$$\begin{array}{r} 4\ 6\ 0\ 7_{(8)} \\ \times\ \quad\quad 3\ 6\ 5_{(8)} \\ \hline \end{array}$$

$$\begin{array}{r} 4\ 3\ 0\ 2_{(5)} \\ -\ 2\ 4\ 1\ 3_{(5)} \\ \hline \end{array}$$

$$\begin{array}{r} 1\ 1\ 0\ 1\ 0_{(2)} \\ \times\ \quad\quad 1\ 1\ 0\ 1_{(2)} \\ \hline \end{array}$$

3. Do the addition table and multiplication table in base-3.

4. Convert the following numbers to decimal:

$$1010010_{(2)}$$

$$4320_{(5)}$$

$$673_{(8)}$$

5. Convert to the indicated base the following decimal numbers:

$$\begin{array}{l} 536 \\ \text{to base-2} \end{array}$$

$$\begin{array}{l} 5296 \\ \text{to base-5} \end{array}$$

$$\begin{array}{l} 32506 \\ \text{to base-8} \end{array}$$

6. Convert the following numbers to the indicated base:

$$\begin{array}{l} 100101_{(2)} \\ \text{to base-5} \end{array}$$

$$\begin{array}{l} 3402_{(5)} \\ \text{to base-2} \end{array}$$

$$\begin{array}{l} 675_{(8)} \\ \text{to base-2} \end{array}$$

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Opción B

7. Do the following operations:

$$\begin{array}{r} 6 \ 0 \ 7 \ 3 \ 6_{(8)} \\ + \ 5 \ 3 \ 0 \ 7 \ 7_{(8)} \\ \hline \end{array}$$

$$\begin{array}{r} 3 \ 4 \ 0 \ 2 \ 0_{(5)} \\ - \ 2 \ 1 \ 3 \ 0 \ 3_{(5)} \\ \hline \end{array}$$

$$\begin{array}{r} 1 \ 0 \ 0 \ 1 \ 0_{(2)} \\ - \ 0 \ 1 \ 0 \ 0 \ 1_{(2)} \\ \hline \end{array}$$

8. Do the following operations:

$$\begin{array}{r} 6 \ 0 \ 5 \ 7_{(8)} \\ \times \quad \quad 4 \ 7 \ 5_{(8)} \\ \hline \end{array}$$

$$\begin{array}{r} 4 \ 0 \ 4 \ 2_{(5)} \\ - \quad 3 \ 2 \ 1 \ 3_{(5)} \\ \hline \end{array}$$

$$\begin{array}{r} 1 \ 1 \ 0 \ 1 \ 0_{(2)} \\ \times \quad \quad 1 \ 1 \ 0 \ 1_{(2)} \\ \hline \end{array}$$

9. Do the addition table and multiplication table in base-5.

10. Convert the following numbers to decimal:

$$110101_{(2)}$$

$$3024_{(5)}$$

$$706_{(8)}$$

11. Convert to the indicated base the following decimal numbers:

$$\begin{array}{l} 924 \\ \text{to base-2} \end{array}$$

$$\begin{array}{l} 3958 \\ \text{to base-5} \end{array}$$

$$\begin{array}{l} 73564 \\ \text{to base-8} \end{array}$$

12. Convert the following numbers to the indicated base:

$$\begin{array}{l} 101011_{(2)} \\ \text{to base-5} \end{array}$$

$$\begin{array}{l} 2344_{(5)} \\ \text{to base-2} \end{array}$$

$$\begin{array}{l} 754_{(8)} \\ \text{to base-2} \end{array}$$

0. NUMERICAL SYSTEMS

OPCIÓN A.

① Do the following operations:

$$\begin{array}{r} 47636_{(8)} \\ + 50657_{(8)} \\ \hline 120515_{(8)} \end{array}$$

$$\begin{array}{r} 40430_{(5)} \\ - 24303_{(5)} \\ \hline 11122_{(5)} \end{array}$$

$$\begin{array}{r} 10010_{(2)} \\ - 01001_{(2)} \\ \hline 01001_{(2)} \end{array}$$

② Do the following operations:

$$\begin{array}{r} 4607_{(8)} \\ \times 365_{(8)} \\ \hline 27643 \\ 34452 \\ 16225 \\ \hline 2217063_{(8)} \end{array}$$

$$\begin{array}{r} 35 \overline{) 18} \\ 34 \end{array}$$

$$\begin{array}{r} 23 \overline{) 18} \\ 72 \end{array}$$

$$\begin{array}{r} 36 \overline{) 18} \\ 44 \end{array}$$

$$\begin{array}{r} 21 \overline{) 18} \\ 52 \end{array}$$

$$\begin{array}{r} 14 \overline{) 18} \\ 61 \end{array}$$

$$\begin{array}{r} 15 \overline{) 18} \\ 71 \end{array}$$

$$\begin{array}{r} 30 \overline{) 18} \\ 63 \end{array}$$

$$\begin{array}{r} 42 \overline{) 18} \\ 25 \end{array}$$

$$\begin{array}{r} 28 \overline{) 18} \\ 43 \end{array}$$

$$\begin{array}{r} 28 \overline{) 18} \\ 22 \end{array}$$

$$\begin{array}{r} 16 \overline{) 18} \\ 02 \end{array}$$

$$\begin{array}{r} 4302_5 \\ - 2413_5 \\ \hline 1334_5 \end{array}$$

$$\begin{array}{r} 11010_2 \\ \times 1101_2 \\ \hline 11010 \\ 00000 \\ 11010 \\ 11010 \\ \hline 10101001_2 \end{array}$$

③ Do the addition table and multiplication table in base 3.

+	0	1	2
0	0	1	2
1	1	2	10
2	2	10	11

•	0	1	2
0	0	0	0
1	0	1	2
2	0	2	11

④ Convert the following numbers to decimal:

$$1010010_2 = 0 + 1 \cdot 2 + 0 \cdot 2^2 + 0 \cdot 2^3 + 1 \cdot 2^4 + 0 \cdot 2^5 + 1 \cdot 2^6 = 2 + 16 + 64 = 82$$

(3)

$$4320_{(5)} = 0 + 2 \cdot 5 + 3 \cdot 5^2 + 4 \cdot 5^3 =$$

$$= 10 + 3 \cdot 25 + 4 \cdot 125 = 10 + 75 + 500 =$$

$$= 585$$

$$673_{(8)} = 3 + 7 \cdot 8 + 6 \cdot 8^2 = 3 + 56 + 6 \cdot 64 =$$

$$= 3 + 56 + 384 = 443$$

⑤ Convert to the indicated base the following decimal numbers:

$$\begin{array}{r}
 536 \quad | \quad 2 \\
 \hline
 13 \quad 268 \quad | \quad 2 \\
 16 \quad 06 \quad 134 \quad | \quad 2 \\
 \boxed{0} \quad 08 \quad 14 \quad 67 \quad | \quad 2 \\
 \quad \boxed{0} \quad \boxed{0} \quad 07 \quad 33 \quad | \quad 2 \\
 \quad \quad \boxed{1} \quad 13 \quad 16 \quad | \quad 2 \\
 \quad \quad \boxed{1} \quad \boxed{0} \quad 8 \quad | \quad 2 \\
 \quad \quad \quad \boxed{0} \quad 4 \quad | \quad 2 \\
 \quad \quad \quad \boxed{0} \quad 2 \quad | \quad 2 \\
 \quad \quad \quad \quad \boxed{0} \quad 1
 \end{array}$$

$$536 = 1000011000_{(2)}$$

(4)

$$\begin{array}{r}
 5296 \quad | 5 \\
 \hline
 029 \quad 1059 \quad | 5 \\
 \hline
 46 \quad 05 \quad 211 \quad | 5 \\
 \hline
 \boxed{1} \quad 09 \quad 11 \quad 42 \quad | 5 \\
 \hline
 \quad \boxed{4} \quad \boxed{1} \quad \boxed{2} \quad 8 \quad | 5 \\
 \hline
 \quad \quad \quad \boxed{3} \quad \boxed{1}
 \end{array}$$

$$5296 = 132141_5$$

$$\begin{array}{r}
 32506 \quad | 8 \\
 \hline
 050 \quad 4063 \quad | 8 \\
 \hline
 26 \quad 063 \quad 507 \quad | 8 \\
 \hline
 \boxed{2} \quad \boxed{7} \quad 27 \quad 63 \quad | 8 \\
 \hline
 \quad \quad \boxed{3} \quad \boxed{7} \quad \boxed{7}
 \end{array}$$

$$32506 = 77372_8$$

⑥ Convert the following numbers to the indicate base:

$$\begin{aligned}
 100101_2 &= 1 + 0 \cdot 2 + 1 \cdot 2^2 + 0 \cdot 2^3 + 0 \cdot 2^4 + 1 \cdot 2^5 \\
 &= 1 + 2 + 32 = 35 = 120_5
 \end{aligned}$$

$$\begin{array}{r}
 35 \quad | 5 \\
 \hline
 \boxed{0} \quad 7 \quad | 5 \\
 \hline
 \quad \boxed{2} \quad \boxed{1}
 \end{array}$$

00. NUMERAL SYSTEMS

OPTION
B

① Do the following operations:

$$\begin{array}{r} 60736_{(8)} \\ + 53077_{(8)} \\ \hline 134035_{(8)} \end{array} \quad \begin{array}{r} 34020_{(5)} \\ - 21303_{(5)} \\ \hline 12212_{(5)} \end{array}$$

$$\begin{array}{r} 10010_{(2)} \\ - 01001_{(2)} \\ \hline 01001_{(2)} \end{array}$$

② Do the following operations:

$$\begin{array}{r} 6057_{(8)} \\ \times 475_{(8)} \\ \hline 36353 \\ 52371 \\ 302\cancel{7}4 \\ \hline 3611663_{(8)} \end{array} \quad \begin{array}{r} 35\overline{)8} \\ \underline{34} \\ 30\overline{)8} \\ \underline{63} \\ 31\overline{)8} \\ \underline{73} \\ 28\overline{)8} \\ \underline{43} \\ 24\overline{)8} \\ \underline{03} \end{array} \quad \begin{array}{r} 29\overline{)8} \\ \underline{53} \\ 49\overline{)8} \\ \underline{16} \\ 42\overline{)8} \\ \underline{25} \\ 23\overline{)8} \\ \underline{72} \end{array}$$

(2)

$$\begin{array}{r}
 4042_5 \\
 - 3213_5 \\
 \hline
 324_5
 \end{array}$$

$$\begin{array}{r}
 11010_2 \\
 \times 1101_2 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 11010 \\
 00000 \\
 11010 \\
 11010 \\
 \hline
 \end{array}$$

$$101010010_2$$

(3) Do the addition table and multiplication table in base-5

+	0	1	2	3	4
0	0	1	2	3	4
1	1	2	3	4	10
2	2	3	4	10	11
3	3	4	10	11	12
4	4	10	11	12	13

•	0	1	2	3	4
0	0	0	0	0	0
1	0	1	2	3	4
2	0	2	4	11	13
3	0	3	11	14	22
4	0	4	13	22	31

(3)

④ Convert the following numbers to decimal:

$$110101_2 = 1 + 0 \cdot 2 + 1 \cdot 2^2 + 0 \cdot 2^3 + 1 \cdot 2^4 + 1 \cdot 2^5 = 1 + 4 + 16 + 32 = 53$$

$$3024_5 = 4 + 2 \cdot 5 + 0 \cdot 5^2 + 3 \cdot 5^3 = 4 + 10 + 375 = 389$$

$$706_8 = 6 + 0 \cdot 8 + 7 \cdot 8^2 =$$

$$6 + 0 + 7 \cdot 64 = 6 + 448 = 454$$

⑤ Convert to the indicated base the following numbers:

$$\begin{array}{r} 924 \div 2 \\ \hline 462 \div 2 \\ \hline 231 \div 2 \\ \hline 115 \div 2 \\ \hline 57 \div 2 \\ \hline 28 \div 2 \\ \hline 14 \div 2 \\ \hline 7 \div 2 \\ \hline 3 \div 2 \\ \hline 1 \div 2 \end{array}$$

12 04 [0]
 06 02 [0]
 03 11 [1]
 15 17 [1]
 08 [0]
 14 [0]
 7 [1]
 3 [1]
 1 [1]

$$924 = 1110011100_2$$

(4)

$$\begin{array}{r}
 3958 \mid 5 \\
 \hline
 45 \quad 791 \mid 5 \\
 \hline
 08 \quad 29 \quad 158 \mid 5 \\
 \hline
 \boxed{3} \quad 41 \quad 08 \quad 31 \mid 5 \\
 \hline
 \quad \boxed{1} \quad \boxed{3} \quad \boxed{1} \quad 6 \mid 5 \\
 \hline
 \quad \quad \quad \boxed{1} \quad \boxed{1}
 \end{array}$$

$$3958 = 111313_5$$

$$\begin{array}{r}
 73564 \mid 8 \\
 \hline
 15 \quad 9195 \mid 8 \\
 \hline
 76 \quad 11 \quad 1149 \mid 8 \\
 \hline
 44 \quad 39 \quad 34 \quad 143 \mid 8 \\
 \hline
 \boxed{4} \quad 75 \quad 29 \quad 63 \quad 17 \mid 8 \\
 \hline
 \quad \boxed{3} \quad \boxed{5} \quad \boxed{7} \quad \boxed{1} \quad \boxed{2}
 \end{array}$$

$$73564 = 217534_8$$

⑥ Convert the following numbers to the indicated base:

$$\begin{aligned}
 101011_2 &= 1 + 1 \cdot 2 + 0 \cdot 2^2 + 1 \cdot 2^3 + 0 \cdot 2^4 + 1 \cdot 2^5 \\
 &= 1 + 2 + 8 + 32 = 43
 \end{aligned}$$

$$\begin{array}{r}
 43 \mid 5 \\
 \hline
 \boxed{3} \quad 8 \mid 5 \\
 \hline
 \quad \boxed{3} \quad \boxed{1}
 \end{array}$$

$$101011_2 = 133_5$$

$$2344_{(5)} = 4 + 4 \cdot 5 + 3 \cdot 5^2 + 2 \cdot 5^3 =$$

(5)

$$= 4 + 20 + 3 \cdot 25 + 2 \cdot 125 = 4 + 20 + 75 + 250 =$$

$$= 349 = 101011101_{(2)}$$

$$\begin{array}{r} 349 \div 2 \\ 174 \div 2 \\ 87 \div 2 \\ 43 \div 2 \\ 21 \div 2 \\ 10 \div 2 \\ 5 \div 2 \\ 2 \div 2 \\ 1 \end{array}$$

~~349~~

$$754_{(8)} = 4 + 5 \cdot 8 + 7 \cdot 8^2 =$$

$$= 4 + 40 + 7 \cdot 64 = 4 + 40 + 448 =$$

$$= 492 = 111101100_{(2)}$$

$$\begin{array}{r} 492 \div 2 \\ 246 \div 2 \\ 123 \div 2 \\ 61 \div 2 \\ 30 \div 2 \\ 15 \div 2 \\ 7 \div 2 \\ 3 \div 2 \\ 1 \end{array}$$